

## CLAIMS

1. A targeting apparatus for a locking nail having cross-bores, the axes of which are disposed in an offset relationship from each other by predetermined distances and/or predetermined angles, comprising:

a targeting arm having at least one target bore therein and a holding device to retain a first end of the nail;

a reception bore in which a retaining bar is guided which bar extends parallel to the targeting arm, the retaining bar has a fastener to fix the nail to a facing end of the bar, the retaining bar has several recesses in the area of the reception bore, the reception bore has associated therewith a movable locking element which can be caused to engage one of the recesses by means of a handle to locate the axial and rotational positions of the retaining bar in the reception bore wherein the arrangement of the recesses is such that the target bore is aligned with a cross-bore of the nail when the locking element engages a recess and that the handle has associated therewith means for indicating whether the locking element is in engagement with the recess or is not in engagement therewith.

2. The targeting apparatus as set forth in claim 1 wherein the handle is rotatably supported on a radially extending outer lug of a retaining portion including the reception bore and the handle actuates a radial cam follower portion which engages with a cam surface such that if the handle is rotated from an initial position in which the locking element is in its unlocking position the locking element is moved into the reception bore by a predetermined direction of rotation and the cam surface has a first cam surface portion joining the unlocked position and a second cam surface portion joining the first cam surface portion,

wherein the engagement of the radial portion in the second cam surface portion takes place in a self-locking manner and the handle or the radial portion is biased by a spring in the direction of the unlocked position.

3. The targeting apparatus as set forth in claim 2 wherein the radial lug is annularly cylindrical and the cam surfaces are defined by a groove in the radial lug wall and the radial portion connected to the handle engages the groove.

4. The targeting apparatus as set forth in claim 3 wherein the radial portion is defined by a cross-pin which radially extends through the lug within the groove.

5. The targeting apparatus as set forth in claim 2 wherein the locking pin has an axial bore in which a helical spring is arranged the other end of which is supported on the cross-bore.

6. The targeting apparatus as set forth in claim 4 wherein the cross-pin extends through a cross-bore of the locking pin.

7. The targeting apparatus as set forth in claim 1 wherein the reception bore is defined by an annularly cylindrical component which is adapted to be located in a recess of the target arm by means of a radial outer tongue.

8. The targeting apparatus as set forth in claim 7 wherein the component has at least one window through which the retaining bar can be seen.

9. The targeting apparatus as set forth in claim 1 wherein the reception bore has prismatic surfaces which are approximately opposed to the locking element and against which the retaining bar is pressed by the locking element.

10. The targeting apparatus as set forth in claim 1 wherein the retaining bar in the area of the recesses, has annular groove by which the locking element can be brought into engagement with the recesses.

11. A targeting device for locating cross-bores in an implanted intramedullary nail comprising:

a targeting arm having at least one guide bore alignable with said cross-bores and a bushing extending along an axis generally perpendicular to said guide bore;

a targeting arm positioning rod rotatably and slidably mounted within a bore of said bushing, said rod fixedly mounted on an end of said intramedullary nail, said positioner rod including a plurality of offset detents corresponding to the locations of said cross-bores on said nail; and

a selectively engageable detent element mounted on said bushing moveable into and out engagement with the detents on said locator rod.

12. The targeting device as set forth in claim 11 wherein said detents on said locator rod are recesses in said rod and said detent element on said bushing is moveable from a first position in said bushing bore wherein said detent element extends partially into said detent recess to a second position in said bore extending fully into said detent recess.

13. The targeting device as set forth in claim 12 wherein said detent element on said bushing is spring biased towards said first position.

14. The targeting device as set forth in claim 13 wherein said bushing has an actuator handle mounted on an outer surface thereof, said handle engaging said detent element on said bushing and being moveable against said spring biasing from a first position wherein said bushing detent element is in said first position to a second position wherein said bushing is in said second position.

15. The targeting device as set forth in claim 14 wherein said handle is rotatably mounted on said bushing outer surface and has a cam surface thereon engageable with a cam follower on said detent element so that rotation of said handle moves said bushing detent element from said first position to said second position against said spring bias.

16. The targeting device as set forth in claim 15 wherein the cam has a first ramp portion and a second ramp portion, the first ramp portion having a steeper angle and dimensioned to prevent said cam follower from entering said second ramp portion unless when said bushing detent element is moved into said second position.

17. The targeting device as set forth in claim 11 wherein said bushing is removably mounted within a fixed bore on said targeting arm.

18. A targeting device for locating cross-bores in an implanted intramedullary nail comprising:

a targeting arm having at least one guide bore alignable with said cross-bores and a bushing extending along an axis generally perpendicular to said guide bore;

a targeting arm positioning rod rotatably and slidably mounted within a bore of said bushing, said rod fixedly mounted on an end of said intramedullary nail, said positioning rod including a plurality of offset detents corresponding to the locations of said cross-bores on said nail;

a selectively engageable detent element mounted within said bushing and moveable into and out engagement with the detents on said positioning rod upon axial and/or rotational movement of the positioning rod with respect to said bushing;

a biasing means for moving said detent element from a first position partially within said bore of said bushing to a second position fully within said bore.

19. The targeting device as set forth in claim 18 wherein said bushing has an actuator handle mounted on an outer surface thereof, said handle engaging said detent element on said bushing and being moveable against said biasing means from a first position wherein said bushing detent element is in said first position to a second position wherein said bushing is said second position.

20. The targeting device as set forth in claim 19 wherein said handle is rotatably mounted on said bushing outer surface and has a cam surface thereon engageable with a cam follower on said detent element so that rotation of said handle moves said bushing detent element from said first position to said second position against said spring bias.

21. The targeting device as set forth in claim 20 wherein the cam has a first ramp portion and a second ramp portion, the first ramp portion having a steeper angle and dimensioned to prevent said cam follower from entering said second ramp portion unless said bushing detent element is moved into said second position.